PRIZES OF THE PARIS ACADEMY OF SCIENCES

THE following is a complete list of the prizes awarded by the Academy at its annual meeting, January 28.

The two great prizes in mathematics and physics were not awarded this year.

In mechanics the Poncelet prize was awarded to M. Laguerre for his mathematical works; the Montyon prize to M. Caspari for his work on Chronometers; the Plumey prize to M. Fremínville for his improvements in steam-engines; the Fourneyron prize to M. Mallet for his tramway engine.

In astronomy the Lalande prize was given to Prof. Asaph Hall, the discoverer of the satellites of Mars; the Vaillant prize to M. Schuloff for his method of detecting the small planets; the Valz prizes to MM. Paul and Prosper Henry for their star maps.

In physics the Lacaze prize was awarded to M. A. Cornu for his researches on the determination of the rate of light.

In chemistry the Jecker prize was awarded to M. A. Houzeau for his researches on the production of ozone; the Lacaze prize to M. Troost for his many valuable chemical researches.

In botany the Barbier prize was divided between M. Galippe for his toxicological studies on cantharides, MM. Lepage and Patrouillard for their services to medicine and pharmacy, and M. Manouvriez for various physiological researches. The Desmazières prize was divided in part between Dr. Quélet for his work on the fungi of the Jura and the Vosges, and M. Bagnis for his memoir on the puccinia. From the Bordin prize an encouragement of 1,000 francs was awarded to M. Charles Eugène Bertram for his work on the lycopodiaceæ; another Bordin prize was awarded to the same botanist for his work in connection with angiosperms and gymnosperms.

In anatomy and physiology the Shore prize was awarded to M. Jousset de Bellesme for his researches on the physiology of insects.

Among prizes in medicine and surgery, one of 2,500 francs was given to Prof. Hannover, of Copenhagen, for his work on the retina of man and the vertebrates; 1,500 francs to Dr. Topinard for his work on anthropology.

In physiology the Montyon prize was divided between Prof. Ferrier and MM. Carville and Duret. The Lacaze prize was given to M. Dareste for his researches on the artificial production of monstrosities.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE

CAMBRIDGE.—The Smith's Prizes have been adjudged as follows:—First prize, John Edward Aloysius Steggall, B.A., Trinity, second wrangler, 1878; second prize, Christopher Graham, B.A., Gonville and Caius College, third wrangler, 1878. By this award it will be seen that the senior wrangler has failed to secure either of the Smith prizes, an unusual circumstance, which has only occurred seven times since the foundation of the prizes by Dr. Smith in 1769, viz., in 1770, 1830, 1859, 1867, 1874, 1875, and again this year.

EDINBURGH.—The Falconer Memorial Fellowship in Palæontology and Geology, of the annual value of about 100*l*., tenable for two years (and, under certain conditions, for a longer period), is now vacant, and is open for competition by graduates in Science or Medicine of the University, of not more than three years' standing at the time of the competition. Names of candidates must be sent, on or before the 1st of April, to the Secretary of the University, from whom further details may be obtained.

The Shaw Fellowship in Mental Philosophy, of the annual value of about 170*l*., tenable for five years, will be open to competition in December next by graduates in arts of either of the four Scottish Universities, of not more than five years' standing at the time of the competition, and by all students of the said Scottish Universities, who, although they have not graduated in arts, have successfully passed all the examinations necessary for graduation in arts within the period of five years before the time of the competition. Candidates must give their names and addresses to the Secretary of the University before December 1.

PRUSSIA.—The ten Prussian universities cost yearly 7,146,000 marks (357,000*l*.), of which sum about two-thirds is contributed directly by the State. This amount is divided as follows:—Berlin, 1,334,700 marks; Bonn, 712,500; Königsberg, 668,600; Breslau, 620,300; Kiel, 478,800; Marburg, 430,400; Halle, 368,800; Göttingen, 268,600; Greifswald, 135,600, and Münster, 102,500. The Saxon Government has difficulty in inducing its parliament to bestow its usual annual grant of 700,000 marks on the University of Leipzig, the argument being advanced that only one-third of the students were natives of the kingdom.

FRANCE.—The new Ministry is making rapid strides in the direction of general education. In a law lately laid before the Chamber of Deputies, we notice an appropriation of 120,000,000 francs, which is intended to serve for the erection or purchase of over 27,000 new school-houses, as well as their equipment.

SCIENTIFIC SERIALS

Annalen der Physik und Chemie, No. 12, 1877.—On the laws according to which gases spread in liquid, viscous, and solid bodies, by M. v. Wroblewski.—On the galvanic resistance of selenium, by M. Forssmann.—On the relation of the electric conductivity of selenium to heat and light, by M. W. Siemens.—Influence of light on the electric resistance of metals, by M. Hanseman.—On the significance of polarisation for the electric behaviour of liquids, by M. Herwig.—On a mode of inference employed by M. Clausius in the electrodynamic theory, by M. Zöllner.—Supplement to a paradox of the mechanical theory of heat, by M. Ritter.—On the Crookes's radiometer, by M. Hankel.—On the perception of colours, by M. Weinhold.—On the composition of æschynite and samarskite, by M. Rammelsberg.—On the inventor of the plate of the air-pump, by M. Gerland.—Supplement to "Studies on Chemical Volumes," by M. Ostwald.

Reale Istituto Lombardo di Scienze e Lettere, Rendiconti, vol. xi. fasc. xvii.—Memoir of Prof. Giuseppe Ferrari.—Reports of the classes, announcement of prizes, &c.

Fasc. xviii.—Experiments with regard to the action of heat on the radiometer, by M. Hajech.—Researches on differential equations, by M. Casorati.—On seismic movements in the valley of Chiana and their influence on the hydrographic condition of the valley of the Tiber, by M. Verri.—On a peculiar horny growth, by M. Sangalli.

Journal de Physique, December.—Telephones, by M. Niaudet.—On a new apparatus for measuring the frequency of periodic movements, by M. Marey.—Continuity of the liquid and the gaseous state of matter, by M. Bouty.—Study on the formation of the negative photographic image, by M. Lermontoff.

Morphologisches Jahrbuch, vol. iii., Part 4.—R. Wiedersheim, on the cranial skeleton of Urodela, ninety pages, four plates, dealing with Siredon, Amblystoma, Salamandra, Chioglossa, Triton, and the Salamandridæ generally.—W. Salensky, on the budding of Salpæ, fifty-four pages, 3 plates.—W. Rauber, on the last spinal nerves and ganglia.

SOCIETIES AND ACADEMIES

LONDON

Geological Society, January 9.—Prof. P. Martin Duncan, F.R.S., president, in the chair.—Ephraim Brunt, T. W. Cowan, and Henry Fox were elected Fellows of the Society.—The following communications were read:—On the great flat lode south of Redruth and Camborne, by Dr. C. Le Neve Foster, B.A.—On some tin-mines in the parish of Wendron, Cornwall, by Dr. C. Le Neve Foster, B.A.—On some of the stockworks of Cornwall, by Dr. C. Le Neve Foster, B.A.—The precarboniferous rocks of Charnwood Forest, Part II., by the Rev. E. Hill, F.G.S., Fellow and Tutor, and the Rev. T. G. Bonney, F.G.S., Fellow and late Tutor of St. John's College, Cambridge. The authors described the result of the microscopic examination of a considerable series of the clastic rocks of Charnwood. Many of these, even among the finer beds, prove to be of pyroclastic origin. The coarser are generally composed of a ground mass of pulverised felspar, with viridite and some iron peroxide, full of larger fragments of felspar crystals (generally both of orthoclase and plagioclase) and lapilli. The structure of these is often distinct, some are certainly andesites, others some kind of trachyte; slaty fragments are also present, and occasional grains of quartz. The authors express their opinion that all the larger felspar crystals, and most, if not all, the quartz grains, are of clastic origin, even in the more highly altered varieties. Some of the larger fragments in the breccias were examined, and referred in part to devitrified trachytes not very rich in silica. The igneous rocks were then described. The syenites of the southern and northern districts were shown probably to belong to one system of intrusion. The hornblendic granite of the Quornden district was also described, and the microscopic structure of the different varieties of it and the above investigated. A number of igneous rocks generally forming dykes in these was described; some appear to be altered basalts, others andesites, one is a felsite, another a diorite. A group of outlying igneous rocks in the vicinity of Narborough was described. Of these, one is a quartz feltsite with some hornblende; another varies between this and a quartziferous syenite; the rest are syenites, and one contains so much plagioclase as to be almost a diorite. One of the above, near Enderby, is seen to be distinctly intrusive in an altered slaty rock, which the authors have no doubt belongs to the Forest series. This discovery proves the igneous character of these rocks also, and extends the area of the slaty series five miles further south than was previously known. A section was devoted to the faults of the Forest region. Here the principal fault runs along the anticlinal axis, with a downthrow on its eastern side which diminishes from 2,500 feet at the north end to 500 feet at the south end. East of this the beds seem undisturbed, but on the west they are shattered by many faults, whose course cannot be traced. These are most numerous near Whitwick. The anticlinal fault is pre-carboniferous. In conclusion, the age of the clastic and of the igneous rocks was discussed. The authors inclined to the opinion that the former are of the same age as the Borrowdale series of the Lake district (lower Silurian), but admitted that the recent discovery of agglomerates in the pre-Cambrian rocks of Wales, and in the probably pre-Cambrian ridges of the Wrekin district, weakens the arguments for this correlation. They do not think that there is any reason for supposing them Cambrian. If the Charnwood series is lower Silurian, they think it most probable that the syenites and the Quornden granite were intruded in some part of the old red sandstone period, and that the later dykes were very probably post-carboniferous but pre-triassic.

Meteorological Society, January 16.—Mr. H. S. Eaton, M.A., president, in the chair.—The Council, in their Report, express their gratification at the increase in the number of the Fellows and stations of the Society, the greater size of the *Quarterly Journal*, and the higher value placed on it by foreign scientific societies, the augmentation of the library, and the addition to the sum hitherto contributed by the Meteorological Council, as well as at other evidences of vigour and progress manifested during the year. The number of Fellows now amounts to 417. The president then delivered his address:—During his tenure of office the alliance between the Meteorological Council and the Society had been further cemented, the Society supplying the Government with certain statistics, and getting some assistance from the Council in return. This arrangement had been completely successful, and the president considered it calculated to foster the growth of climatic meteorology under the auspices of the Society, and likely to remove any jealousy on the part of the public towards a governmental department so peculiarly constituted as the Meteorological Council. After criticising some of the work undertaken by the last-mentioned body, Mr. Eaton exhibited curves of the results of the hourly observations of the barometer and thermometer for the year 1876 at Valentia, Armagh, Glasgow, Aberdeen, Falmouth, Stonyhurst, and Kew, these being the stations established in 1868 for determining the meteorological constants of the British Isles. The curves showing the combined diurnal and semi-diurnal variation of atmospheric pressure might be referred to one of two distinct types. In one of them the minimum of pressure was most pronounced in the morning, in the other in the afternoon. The former type was found at the maritime stations of Valencia and Falmouth, the latter at inland stations such as Kew. The diurnal range of the temperature of the air was closely related to the pressure. It was least at the maritime stations, reaching only 4°·8 at Falmouth, and attaining a maximum of 9°·3 at Kew.—The following gentlemen were elected Officers and Council for the current year:—President: Charles Greaves, M.Inst.C.E., F.G.S. Vice-Presidents: Henry Storks Eaton, M.A., James Park Harrison, M.A., Robert James Mann, M.D., F.R.A.S., Charles Vincent Walker, F.R.S. Treasurer: Henry Perigal, F.R.A.S. Trustees: Sir Antonio Brady, F.G.S., Stephen William Silver, F.R.G.S. Secretaries: George James Symons, John W. Tripe, M.D. Foreign Secretary: Robert H. Scott, M.A., F.R.S. Council: Hon. Ralph Abercromby, Arthur Brewin, F.R.A.S., Charles Brooke, F.R.S., Edward Ernest Dymond, William Ellis, F.R.A.S., Rogers Field, B.A., M.Inst.C.E., John Knox Laughton, F.R.A.S., Rev. William Clement Ley, M.A., Richard Strachan, Henry Samuel Tabor, Capt. Henry Toynbee, F.R.A.S., George Mathews Whipple, B.Sc.—A resolution was passed to the effect that ladies be admissible as Fellows of the Society.

Physical Society, January 19.—Prof. G. C. Foster, president in the chair.—The following were elected Members of the Society:—J. Angell, Lieut. G. S. Clarke, R.E., T. F. Iselin, M.A., J. W. Russell, M.A.—Mr. W. H. Preece read a paper on some physical points connected with the telephone. This instrument may be employed both as a source of a new kind of current and as the detector of currents which are incapable of influencing the galvanometer. It shows that the form and duration of Faraday's magneto-electric currents are dependent on the rate and duration of motion of the lines of force producing them, and that the currents produced by the alteration of a magnetic field vary in strength with the rate of alteration of that field; and further, that the infinitely small and possibly only molecular movement of the iron plate is sufficient to occasion the requisite motion of the lines of force. He pointed out that the telephone explodes the notion that iron takes time to be magnetised and de-magnetised. Mr. R. S. Brough has calculated that the strongest current employed in a telephone is $\frac{1}{10000000000}$th of the C. G. S. unit. Mr. Preece explained that the dimensions of the coil and plate depend on the strength of the magnet, but the former should always consist of fine wire and be made as flat and thin as possible. The adjustment of the position of the magnet (as near as possible to the plate without touching) is easily effected by sounding a vowel sound *ah* or *o* clearly and loudly; a jar is heard when they are too near together. After briefly enumerating the attempts which have been made to improve the instrument, he mentioned the various purposes to which it can be applied. In addition to being useful in the lecture room, in conjunction with several well-known forms of apparatus, it forms an excellent detector in a Wheatstone bridge for testing short lengths of wire, and condensers can be adjusted by its means with great accuracy. M. Niaudet has shown, by employing a doubly wound coil, that it can be used to detect currents from doubtful sources of electricity, and it is excellent as a means of testing leaky insulators. Among the facts already proved by the telephone may be mentioned the existence of currents due to induction in wires contiguous to wires carrying currents, even when these are near each other for only a short distance. Mr. Preece finds that if the telephone wire be inclosed in a conducting sheath which is in connection with the earth, all effects of electric induction are avoided; and further, if the sheath be of iron, magnetic induction also is avoided, and the telephone acts perfectly. A great number of experiments on the use of the instrument on telegraphic lines were then described, from which it appears that conversation can be carried on through 100 miles of submarine cable, or 200 miles of a single wire without difficulty, with the instrument as now constructed. The leakage occurring on pole-lines is fatal to its use in wet weather, for distances beyond five miles. An interesting series of telephones was exhibited, and by means of one of very large dimensions Mr. Preece showed that the currents produced by pressing the centre of the plate sensibly affect a Thomson galvanometer, and that the motion of the needle ceases in a remarkably instantaneous manner as soon as the pressure is removed, a necessary condition in order that the receiving-plate should accurately reproduce the motions of the sending-plate. In the discussion which followed, Mr. R. Sabine suggested that the failure of all attempts at improving the instrument by increasing its dimensions might be due to the *damping* action of the permanent magnet on the plate, the strain on it being proportional to the size of magnet and rendering it less sensitive to the sonorous waves. Mr. Coffin pointed out how interesting it would be if, instead of employing a receiving-instrument, the currents could be communicated directly to the auditory nerves, and Prof. Adams explained the relation subsisting between the character of the vibrations of the disc and the character of the electric currents to which they give rise.—Dr. Lodge described a simple form of apparatus for determining the thermal conductivity of rare substances, such as crystals, which cannot be obtained in slabs or rods. It consists of two small tin cans with a copper arm about eight inches long projecting horizontally from each, the external ends being clean and flat. They are placed in a straight line with the crystal between them, and held together by a slight horizontal pressure. Holes are drilled in the copper rods for thermometers, and the curves of temperature being given by these, that for the intermediate crystal can be at once calculated.

Victoria (Philosophical) Institute, January 21.—Prof. Lias, of St. David's College, read a paper on Matthew Arnold and modern culture.

February 4.—The Right Reverend Bishop Cotterill read a paper upon scientific thought and religious belief.

Institution of Civil Engineers, January 22.—Mr. Bateman, president, in the chair.—The paper read was on some recent improvements in dynamo-electric apparatus, by Dr. Higgs, Assoc. Inst. C.E., and Mr. Brittle, Assoc. Inst. C.E.

MANCHESTER

Literary and Philosophical Society, December 11, 1877.—Mr. E. W. Binney, F.R.S., president, in the chair.—Note on the daguerreotype portrait taken of the late Dr. Dalton, by J. B. Dancer, F.R.A.S.—Note on metallic niobium and a new niobium chloride, by Prof. H. E. Roscoe, F.R.S.—On the retention of saline impurities by hydrated ferric oxide, by Mr. Charles Frederick Cross, Dalton Scholar in the Owens College. Communicated by Prof. H. E. Roscoe, F.R.S.

December 26.—Mr. E. W. Binney, F.R.S., president, in the chair.—Notice of a large boulder stone at Old Trafford, Manchester, by E. W. Binney, F.R.S.—On the geometrical representation of the equation of the second degree, by Charles Chambers, F.R.S., Superintendent of the Colaba Observatory, Bombay. Communicated by J. A. Bennion, F.R.A.S.

EDINBURGH

Chemical Society, January 16.—Mr. W. Inglis Clark, B.Sc., vice-president, in the chair.—A paper was read by Mr. John Gibson, Ph.D., F.R.S.E., on yttrium and erbium, being the second part of an historical sketch of the rarer elements.

January 30.—Mr. Newton Burns presiding.—Papers were read by Mr. G. Carr Robinson, F.R.S.E., on the solid fatty acids of cocoa-nut oil, and by Messrs. Robinson and Thomson on the composition of gases from lime-kilns.

PHILADELPHIA

Academy of Natural Sciences, July 3.—Prof. G. A. König, on protovermiculite, a new micaceous mineral from Arkansas, $R'_3R^{vi}Si^{iv}_3O'_{12}+H_2O$, related to jefferisite and colsagecite.

July 24.—Mr. J. A. Ryder, on colour variation in mammals. The distribution of colour in wild and domestic animals was compared, showing that bilateral symmetry of colouring is interfered with in some way by domestication, wild animals almost invariably being symmetrically coloured.

July 31.—Dr. Rothrock, on the poisonous properties of the Leguminosæ.

August 14.—Prof. G. A. König, on strengite, from Virginia. This mineral, $Fe_2P_2O_8+4H_2O$, was discovered in cavities in dufrenite.

August 28.—Dr. D. J. Jordan and W. S. Brayton, on Lagochila, a new genus of catostomoid fishes, known in Georgia as the Hare-lip Sucker.

WELLINGTON

Philosophical Society, August 4, 1877.—W. T. L. Travers, F.L.S., M.H.R., president, in the chair.—Dr. Hector drew attention to several interesting additions to the museum, which were arranged on the table. Among the most important was a handsome bird from New Guinea, the *Goura victoriæ*.—Mr. Kirk also called attention to a log of black maire, a species of olive (*Olea apitita*), sent by Mr. Elliotte, of the Pakuratahi, which, on account of its great hardness, is much used as blocks and cogs in machinery.—Capt. Edwin read a letter from Mr. Rawson, on the reciprocity of seasons, the character of the seasons in Europe being followed by a similar season in Australia and New Zealand. Mr. Carruthers thought that even in New Zealand the seasons did not agree; and Dr. Hector said it would be necessary to fix upon the one place for comparison, as seasons were not uniform, a moist season on the east coast being frequently a dry season on the west coast. Dr. Newman considered that the seasons were affected all over the world by sun-spots.—Mr. McKay then read a paper on gold found in the Mackenzie district of Canterbury; on which subject Dr. Hector added some interesting information regarding the occurrence of gold generally in that district, and pointing out that Mr McKay's observation that the gold and associated quartz were found only in the last formed moraines and alluviums, confirmed his theory that the retirement of the glaciers was chiefly due to the erosion of the mountains.

VIENNA

Imperial Academy of Sciences, December 13, 1877.—On the present state of the water question, by M. Wex.—On the anatomy of the African elephant, by M. Mojsisovics.—The electrical after-currents of transversally magnetised iron bars, by M. Streintz.

December 20.—The protoplasm of the pea, by M. Tangl.—On a new apparatus for direct volumetric determination of the moisture of the air, by M. Schwackhofer.—Elementary deduction of the complete formula for determination of the tone of vibration of a mathematical pendulum, by M. Pscheidl.—Contribution to knowledge of cupric chloride, by M. Rosenfeld.—On the air-pressure at Vienna, with supplemental remarks on the temperature of Vienna, by M. Hann.

GÖTTINGEN

Royal Academy of Sciences, November 3, 1877.—Attempt at a theory of electric separation through friction, by M. Riecke.

December 1.—Report of the Secretary (126th anniversary).—Obituary notice of von Baer.—Announcement of subjects for prize competition, &c.—On the formation of the volcano of Fuego in Guatemala, and account of an ascent of it, by M. von Seebach.—On the origin of language, by M. Benfey.

December 26, 1877.—New geometrical and dynamical constants of the earth, by M. Listing.

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